Dubai Creek Maritime Museum
Comprehensive Architectural Studio, Spring 2017
"A Tectonic Study"

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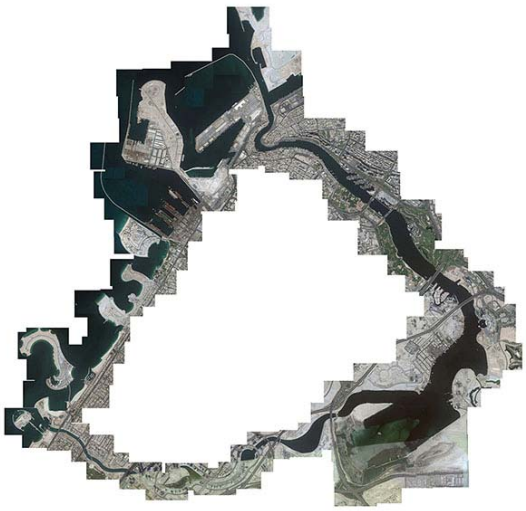


Introduction:

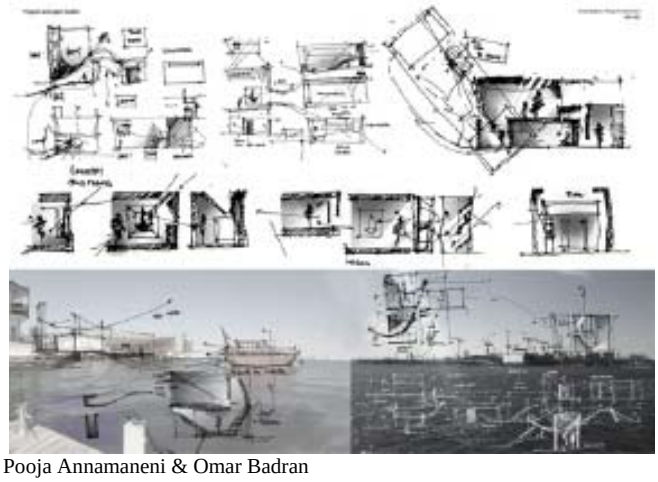
The American University of Sharjah is a relatively young University having been founded in 1998. The college of architecture art and design, CAAD is one of the colleges that make up the University. The school of architecture is a five- year program, modeled after programs based in the USA, with the first year dedicated to "foundations" and upon acceptance the next four years focused on architectural studio courses. The program is the only program in the Middle East region to be accredited by the US, National Architectural Accrediting Board, NAAB, and adheres to the curricular criteria established in its "matrix". The second semester of the students fourth year is designated as a "comprehensive studio" effectively established to judge the student's ability to holistically consider, incorporating all they have learned from both previous design studios and their lecture courses. The NAAB required course outcomes are rigorous, and covers everything from pre-design, to a refined sense of materiality, to an integral understanding of structure, MEP, and life safety concerns. The metrics are onerous to the students, and fundamental to our concerns as teachers, is to prevent design quality from being compromised, in fact central to our position is to instill the potential, that to paraphrase Mies Van der Rohe, comes from making, not forms, but buildings. The design potential that comes with the consideration of increasing complexity of building systems is manifest in many ways throughout the semester, but it begins as it should with the site and integral to the site, the landscape.
Around the world there is increasing disconnect between interior and exterior, building and landscape, higher temperatures, lower temperatures, increasing toxicity, status recognition and a plethora of other psychological and environmental issues have exasperated the need for the protective layer that separates interiority from exteriority. In the UAE this condition is particularly evident, temperatures for 6 months of the year in excess of 40º Celsius, air quality that is more often than not choked by dust and pollutants, is traversed by moving from one hermetically conditioned unit to the next-housing to car –to work or school- back to car-back to housing, it a condition of being that makes living on Mars seem somehow plausible. It is a condition that seems especially problematic here in the UAE, where if students consider the landscape at all, it is usually only as afterthought, with tree cad symbols stamped onto plans, many times without regard to the fact that they are trying to grow the tree directly out of a hardscape material like concrete. In general, the consideration of the landscape as performative aesthetically, for both individual and collective engagement, and technically as for passive cooling strategies is a foreign concept to most of the students.
The appreciation and design potential of the landscape was a fundamental emphasis of this studio. The natural geography of the UAE is sublime in the best of the landscape tradition. It is a natural landscape that is, dominated by entropy, entropy as perhaps best defined here by the artist Robert Smithson as "sameness" like his Sandbox Monument it is the mixing to pink, by wind and industry, of the white sand of the coast, and the red sands of the hinterlands which cannot be reversed to rediscover their original colors. The pinkness of the sand

permeates everything from the ground plane to the atmosphere. It is ironically the entropy of the oil that lies below the sand, pumped to the surface again that has become the source of what crystalizes the city, to include among other things the world's tallest building in defiance, a negentropy, of the desert sand that surrounds it. Arguably the most important natural landscape feature of Dubai is the creek. The Dubai Creek is a salt water creek, an inlet from the Arabian Gulf which allowed the city to develop as a port for trade, and for pearl diving and fishing. Folklore suggests that the creek once extended much deeper into the UAE, but in recent history the creek has culminated in the Ros Al Khor wildlife sanctuary, a sanctuary that is unique in the urban area in as much that it dedicated to the protection of indigenous flora and fauna, including large swaths of mangrove trees and migratory birds. In the last year the emirate has completed an extension of the creek which creates a channel that circumnavigates the heart of the city, effectively defining in "cut" what the Palm Jumeirah Island did through "fill" growing the emirates "waterfront" real estate. The gentrification of the past patterns that existed along the creek is in full swing with past industrial buildings associated with the creek being replaced but luxury condominiums. It is in this context that we decided to site the studio project.

The Site:

The project site itself is a working shipyard specializing in the construction of dhows, the traditional Arabian boat for fishing and pearl diving, we will return the importance of this vessel later when discussing materiality and tectonics, but for the discussion of the site its location and activity became the lynchpin for a serious investigation of a site, in the form of a "site analysis". In general, as pedagogical aim we feel the site analysis is an exercise that should promote the asking of questions, as much or more than the strictly answering of questions. Further-more that the analysis should intertwine the processes of the empirical and measured, with the distillation of the abstract, to the potential for deliquescence of the chance observation. The first issue with the site that we asked the students to consider was its place within the nucleus of Dubai, for all practical purposes the site and for that matter the entire tract of land that defines the western creek edge represents one of the few tracts of land that had not yet been branded by real estate development, as such it still represented the possibility of purposing a different course for development, a course that possibly suggested the pedestrian conditions of landscape, public space, in contrast to the private and hermetic.
The site provided many layers of interpretation including, the aforementioned historical significance of the creek, relative to the hyper-development in the past forty years of its current nebulous form. The site also presented the opportunity to study the site as a transportation nexus. There was the choice of water access via a ferry service across and up and down the creek to the site. This water datum provided the students with a unique perspective in approach that reinforced a understanding of the site from the macro to the micro, as well as edge and contextual connectivity that water course is uniquely capable of providing. another speed and perspective, there is the elevated Dubai metro line which has a station immediately adjacent to our site, and is slated in its master plan to extend its track over the creek, connecting the rapidly developing Eastern edge of the city. Not to be forgotten is the ubiquitous presence of the car. E 311 which possibly the most frenetic road in the UAE presents the western edge which divides the boundary of Creekside with the nucleus of the city.

The Program:



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The program called for the design of a “maritime museum” dedicated to the history and significance of the UAE’s maritime legacy, largely the dhow’s role in the development of the UAE. The interior program focused around the possibility of display of full-scale display of boats, scaled models, other maritime artifacts, and two-dimensional media display. There was also a library archive component, a café and ancillary spaces. The program was designed to be 2 stories in height so that students would be required to design for, as required by NAAB outcomes, accessible ingress and egress specified in the International Building Code. Additionally, the students were required to design the exterior site for a parking lot of 60 cars, and to design a minimum of 15% of the site as landscape, with an additional 10% of the site designed for the water-scape. The program is deliberately kept simple, with 20% of the net floor area provided for circulation with the goal of getting the students to consider circulation not as ancillary, but as performative, intensifying the consideration of elements such as stairs, so as to avoid the relative safety of considering them as egress alone. The same went for corridors asking the students to consider them not as conduits, but as potential for respite and reflection. The simplicity of the program was also intended to maximize the student’s ability to engage in all aspects of the design holistically, not to become consumed by making sure that everything fit.

The Code:

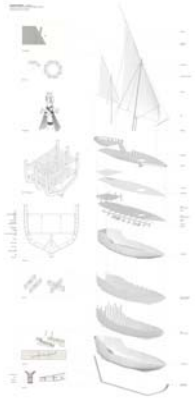
Understanding the fundamentals of navigating the International Building Code was another important outcome of the studio and the NAAB criteria. Through lectures and assignments students were asked to understand how to review their proposed buildings in the IBC, and further to understand the implications the code would have on their projects, both spatially and materially. What was hoped and stressed most from the students was an appreciation of the exception, that by paying attention to the declared exceptions, and by maintaining a certain malleability, especially spatially with the footprint of the building relative to the property lines for instance, the designer can change their building from a type VA, 1-hour construction to a type VB, non- rated construction, with implications in the selection and use of materials becoming vastly more inclusive. Ultimately it was our goal to get the students to consider the code review like everything else as a design problem, one in which the right answer is not evident, but by maintaining rigor and flexibility, maximum design potential can be achieved. Accessibility was another provision students were required to address, but again here the objective here was to

get them to realize accessibility not as an obstacle but as an opportunity, so that a ramp while needing to provide for maximums, for instance in regard to slope, it is not subject to minimums. A ramp is a way of moving vertically that establishes a cadence unique from both a stair and an elevator. In the same vein they were also asked to consider the elevator not simply as an expedient way of fulfilling a code requirement, but as a liminal condition between space in both plan and section.

Teamwork:

As part of the pedagogical experience of the studio, students are required to work in teams of two, per their choice of working partner. As there are 16 students per section and faculty, this has obvious advantages with regard to maximizing the amount of help and criticism we as instructors can give. More important for pedagogy it is meant to instill in the students a sense of the responsibility and management that is required in organizing a project of this size. For the sake of learning the students are required to negotiate through, the sometimes difficult, differences in aesthetic, research, technical and organizational skills. Often in the architecture studio educational model, the interpretation and reward for design is limited by time and skill level to a more superficial and formal interpretation, a great benefit of both the comprehensive studio, and the working in teams, is the expanded research and technical acuity. By working in teams, the students have the opportunity to engage in these endeavors more thoroughly by forming a reciprocal bond between formal design and technical research and in the best sense of a working process, exchanging roles in the process, allowing for a fresh objectivity and renewed vigor. It is hoped that through confluence and compromise they will realize the potential to all aspects of the design and production when they are working as a team, and conversely the discord and disruption to potential, when they are at odds with one another. As a way of monitoring above and beyond normal interaction with the groups, a “time sheet”, like what would be used in office was employed. Individual students for each assignment turn-in were required to complete a time sheet in which they detailed the amount of time spent on individual tasks. The time sheet served as a means to better assuring that the responsibilities of the project were being carried out equitably.

Case Study:



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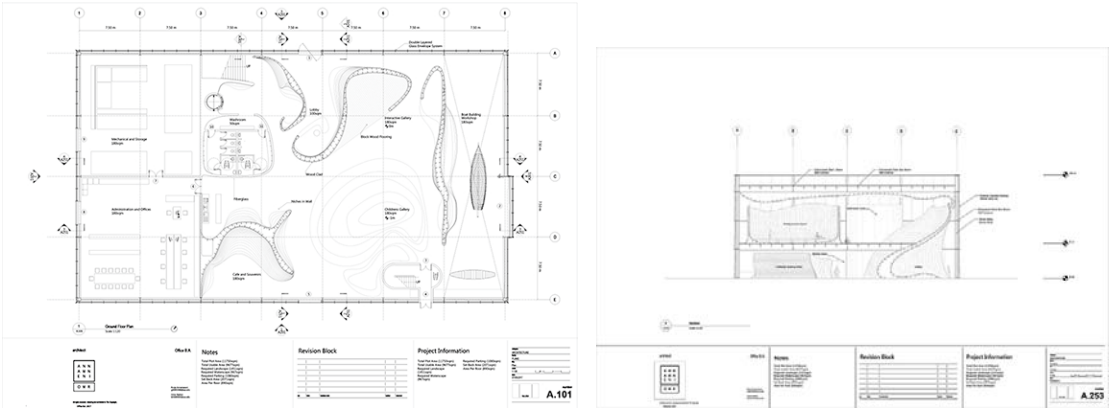
As is typical for this course students were asked first to prepare a precedent study, looking at past examples of how architects had approached the problem of the maritime museum, but rather than look at one architect and one building, students were compelled to consider and critique different buildings for different reasons, for instance the choice of a structural system, what were the technical reasons for the choice, what were the aesthetic reasons for the choice, how did those choices conflate and or what was compromised in the manifestation of the building as a whole. Along with the more traditional precedent exercise, we also included a more refined analysis, that looked specifically at the craft of boat-building. Students were asked to choose any type of boat they wanted, but were recommended, because of it's historic and contextual relation, the dhow, the traditional sailing vessel of merchants, pearl divers, and fisherman in the UAE, which also by virtue of its construction out of wood, opened the students to the possibilities of using wood. With all the studies there was much to learn about materiality, and hardware, which when removed from the context of purely building opened up the possibility of analysis that was more rigorous and more resonate.

Plans and Sections:



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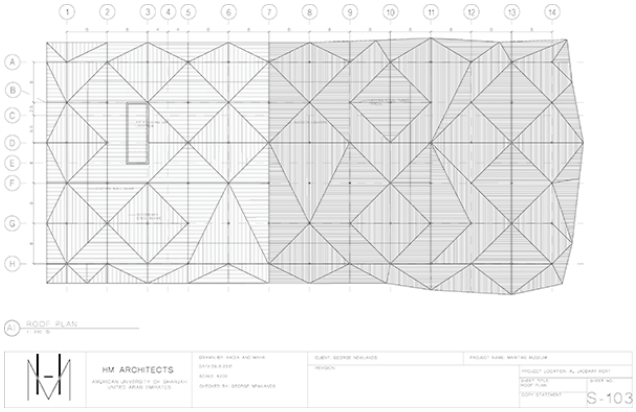
Out of the program studies emerged the initial outline diagrams of plans and sections. Because in part of the program studies which included the programing of the site, there was a comfortable reciprocity between the site plan and the building plan that allowed for the opportunity to break from the typical boundary lines of exterior wall and site, and blur that distinction altogether. The program as already stated was deliberately kept simple so that students would stay focused on the deliberation of passage, volume, the quality of light, both natural and artificial, to name some, without entertaining the complexities of additional scale and program adjacencies It was intended in the spirit of holistic thinking that when focusing on the qualities that make a exhibition gallery, for instance, successful, they would be able to build on their past experiences with similar design problems, and that the new would become evident in the transition from the macro to the micro, in materiality, constructability, to detail.

A struggle, as always, with students is to get them to see the potential and effectiveness in working simultaneously on plan section, and elevation. The power and potential of the digital model is enormously attractive, it's ability visualize, to offer the experience of atmosphere through virtual representations of climate and light, and a complete material palette offer incredible new design possibilities, this is not lost on us as educators however while these new tools offer much in contribution to design and presentation, still a large part of what the comprehensive studio is about, is the communication of building construction craft and strategy. This is a communication that is largely internal to the architecture and construction professions, and it is a communication that while aided by digital visualization, is nevertheless grounded in the orthographic fundamentals of plan, section and elevation. It is the fore-fronting of the idea that the communication of building construction happens at a variety of scales, macro to micro, and that dimension, or relative position is what anchors this communication. It is the understanding that a wall is amalgamation of materials and systems, in the case of some walls, and a monolithic condition in others, each with their own attributes of layer, mass, and thickness

Framing Plans:



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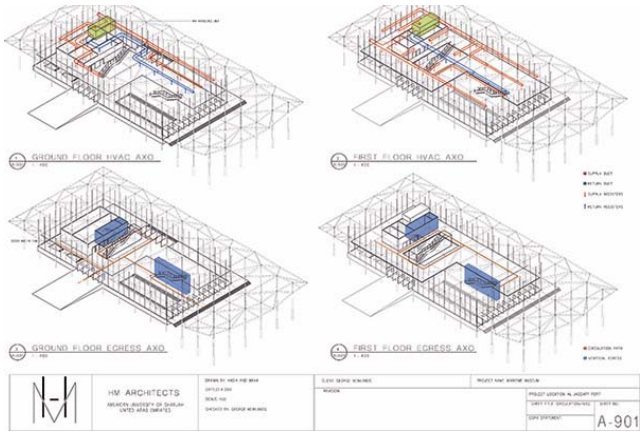
The proximity of boat building yards was an important aid in the students understanding of the construction process, they were able to see the dhow boats in various stages of completion thereby allowing them to work both backwards and forwards in the construction time-line. There was also on display the tectonics, the observable structural relationship between the primary, the keel, the secondary, the ribs and beams, and the tertiary, the planking and decking, allowing the students a more or less visceral connection in understanding their own framing systems. Framing plans were done in conjunction with material studies. Students were expected to not only start to identify finish materials both interior and exterior, but also to identify the materiality of their structural systems, from foundation through floors, walls, columns, beams, and roof, to understand those materials and the pros and cons of their structural performance, and to be able to size them for the framing plan, which they understood would become the basis for both building and wall sections. Finally, there was a consideration that needed to be made regarding whether or not to express the tectonic as an aesthetic and spatial part of the building, or whether to conceal the tectonic for the sake of spatial and volumetric purity, to lesser or greater degrees both paths were pursued.

MEP Diagrams:



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Students are expected to understand and incorporate the mechanical, electrical and plumbing systems into their projects, and furthermore to design these systems, and while sizing, (albeit schematic) the fixtures, units and their conduits is a part of the design there are other decisions as well: How do the systems integrate into the rest of the design, are they visible, or are the concealed. In the case of the HVAC ducts if they are exposed, how are the functional requirements, the tapering of duct sizes, reconciled and expressed. Whether concealed or expressed, how are the ducts woven into the structural systems. There is in addition the question of sustainable design with the MEP systems. To this end we ask the students to first to be conscious of how and where they are using glass in the building, how can they maximize daylighting, but also minimize heat gain. Congruent with this issue is the recognition of the role and benefit of insulation in the building, and furthermore the understanding of the implications that material choices have in this consideration. Exposed cast in place concrete for instance, a perennial student favorite, while seeming to have the benefit of thermal mass, that

benefit is nevertheless compromised in the UAE by the fact that there is minimal diurnal/ nocturnal temperature change, so insulating the concrete, while careful of the exposed aesthetic becomes a problem. The use of both solar and wind power generation is also emphasized, in Dubai both are abundant, and the students were asked to consider not only their buildings for the placement of these technologies, but also the large area of the site dedicated to parking, with its need to provide shade for both vehicle and pedestrian, the parking lot provided an excellent resource for the inclusion of these technologies. Consideration was also asked to be given to plumbing strategies, primarily grey water through the possible collection of lavatory and rain water, into cisterns where it could be redistributed as irrigation.

Wall Section Model:

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The assignment was the construction of a 1:20 scale wall section model based on previously submitted wall section drawings, and an extruded rendered wall section drawing that articulated materiality, size and thickness, and for all intents and purposes became an effective guide for the model construction. Students were allowed to pursue as many representational materials as they wanted, but it was stressed for the sake of clarity that they simplify the palette, even if possible using only bass wood. Beyond just the clarity, the construction of the structural material provided, students also built and scaled and integrated their mechanical systems into the model so they were able to appreciate those needs within the spectrum of the project.

Conclusion:

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The comprehensive studio is typically the summation or capstone project of their undergraduate architectural education, it is incumbent on the students to be capable of learning and practicing a good deal of new information, and simultaneously drawing on past experience. While there is nothing new in this, it is in fact the basis of the architectural curriculum and pedagogy, there is though in the comprehensive studio the additional required rigor of displaying the ability to incorporate the technical including, mechanical and structural issues into the design. Students need to be able to communicate both the sensory qualities, and perhaps more importantly, the construction, and building considerations of craft and quantity, put together in a set of drawings that ideally like the building it represents is crafted, consistent and organized representation of intent.